CLAIMS:

1. A gene cluster having open reading frames which encode polypeptides sufficient to direct the synthesis of a safracin molecule.

2. A nucleic acid sequence comprising:

a) a nucleic acid sequence encoding at least one non-ribosomal peptide synthetase which catalyse at least one step of the biosynthesis of safracins;

b) a nucleic acid sequence which is complementary to the sequence in a); or

c) variants or portions of the sequences of a) or b).

3. The nucleic acid sequence according to claim 2 which comprises SEQ ID NO:1, variants or portions thereof.

4. The nucleic acid sequence according to claim 2 which comprises at least one of the *sacA, sacB, sacC, sacD, sacE, sacF, sacG, sacH, sacI, sacJ, orf1, orf2, orf3* or *orf4* genes, including variants or portions thereof.

5. The nucleic acid sequence according to claim 2 wherein the nucleic acid encodes a polypeptide which is at least 30% identical in amino acid sequence to a polypeptide encoded by any of the safracin gene cluster open reading frames *sacA* to *sacJ* and *orf1* to *orf4* (SEQ ID NO:1 and genes encoded in SEQ ID NO:1) or encoded by a variant or portion thereof.

6. The nucleic acid sequence according to claim 2 which encodes for any of SacA, SacB, SacC, SacD, SacE, SacF, SacG, SacH, SacI, SacJ, Orf1, Orf2, Orf3 or Orf4 proteins (SEQ ID NO:2-15), and variants, mutants or portions thereof.

7. The nucleic acid sequence according to claim 2 which encodes a peptide synthetase, a L-Tyr derivative hidroxylase, a L-Tyr derivative methylase, a L-Tyr O-methylase, a methyl-transferase or a monooxygenase or a safracin resistance protein.

8. The nucleic acid sequence according to any one of claims 3-6 wherein the portion is at least 50 nucleotides in length.

9. The nucleic acid sequence according to claim 8 wherein the portion is in the range between 100 to 5000 nucleotides in length.

10. The nucleic acid sequence according to claim 8 wherein the portion is in the range between 100 to 2500 nucleotides in length.

11. A hybridization probe comprising a nucleic acid sequence according to any one of the preceding claims.

12. The hybridization probe according to claim 11 which comprises a sequence of at least 10 nucleotide residues.

13. The hybridization probe according to claim 11 which comprises a sequence between 25 to 60 nucleotide residues.

14. Use of a hybridization probe according to any one of claims 11-13 in the detection of a safracin or ecteinascidin gene.

15. The use according to claim 14 wherein the gene detection is conducted in *Ecteinascidia turbinata.*

16. A polypeptide encoded by a nucleic acid sequence of any one of claims 2-10.

17. The polypeptide according to claim 16 which comprises an amino acid sequence selected from the group consisting of SEQ ID NO:2-15.

18. A vector comprising a nucleic acid sequence of any one of claims 2-10.

19. The vector according to claim 18 which is an expression vector.

20. The vector according to claim 18 which is a cosmid.

21. A host cell transformed with one or more of the nucleic acid sequences of any one of claims 2-10.

22. A host cell comprising a vector of any one of claims 18-20.

23. The host cell according to claim 22 wherein the host cell is transformed with an exogenous nucleic acid comprising a gene cluster encoding polypeptides sufficient to direct the synthesis of a safracin.

24. The host cell according to claims 22 or 23 which is a microorganism.

25. The host cell according to claim 24 which is a bacterium.

26. A recombinant bacterial host cell in which at least a portion of a nucleic acid sequence of any one of claims 2-10 is disrupted to result in a recombinant host cell that produces altered levels of safracin compound or safracin analogue, relative to a corresponding nonrecombinant bacterial host cell.

27. The recombinant cell of claim 26, wherein the disrupted nucleic acid sequence is endogenous.

28. A method of producing a safracin compound or safracin analogue comprising fermenting an organism in which the copy number of the gene cluster of claim 1 has been increased.

29. A method of producing a safracin compound or safracin analogue comprising fermenting an organism in which expression of genes encoding polypeptides sufficient to direct the synthesis of a safracin or safracin analogue has been modulated by manipulation or replacement of one or more genes or sequence responsible for regulating such expression.

30. A method of producing a safracin compound or safracin analogue comprising contacting a compound that is a substrate for a polypeptide encoded by one or more of the open reading frames of the safracin biosynthesis gene cluster of claim 1 with said polypeptide, wherein the polypeptide chemically modifies the compound.

31. The method according to claims 28 or 29 wherein the organism is *Pseudomonas* sp.

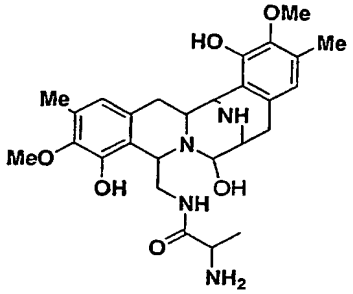
32. A composition comprising at least one nucleic acid sequence of any one of claims 2-10.

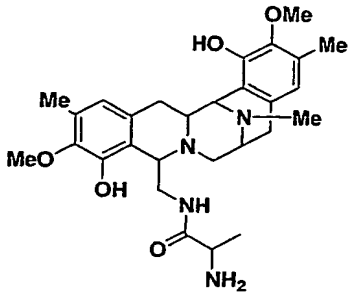
33 Use of a composition according to claim 32 for the combinatorial biosynthesis of one or more of non-ribosomal peptide synthetases, diketopiperazine rings and safracins.

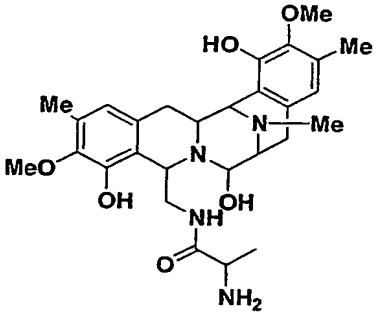
34. Use of P2, P14, analogs and derivatives thereof in combinatorial biosynthesis of one or more of non-ribosomal peptide synthetases, diketopiperazine rings and safracins.

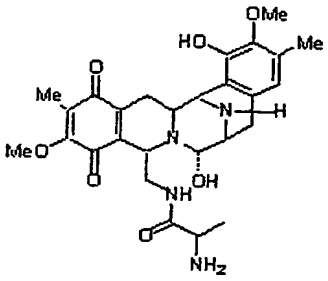
35. A safracin compound obtainable by a method according to any of claims 28-31.

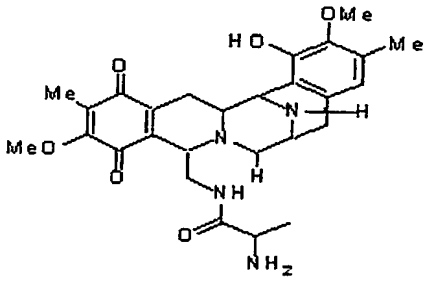
36. A safracin compound according to claim 35 wherein the compound has one of the following formulas

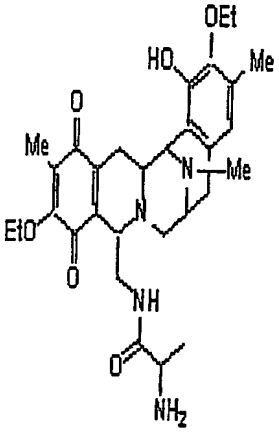


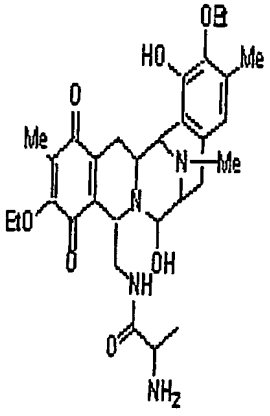












37. Use of a compound according to claims 35 or 36 as an antitumor agent.

38. Use of a compound according to claims 35 or 36 in the manufacture of a medicament for the treatment of cancer.

39. Use of a compound according to claims 35 or 36 as an antimicrobial agent.

40. Use of a compound according to claims 35 or 36 in the manufacture of a medicament for the treatment of microbial infections.

41. A pharmaceutical composition comprising a compound according to claims 35 or 36 and a pharmaceutically acceptable diluent, carrier or excipient.

42. Use of a compound according to claims 35 or 36 in the synthesis of ecteinascidin compounds.